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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/020,543	11/30/2001	Xiang-Dong Mi	83664AEK	9166

7590 05/04/2005

EXAMINER
QI, ZHI QIANG

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 05/04/2005

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/020,543	MI ET AL.	
	Examiner	Art Unit	
	Mike Qi	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 February 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,6-9 and 11-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,6-9 and 11-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1, 6-9,11-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 15, recitation ". . .wherein the two planes are perpendicular to each other" that is indefinite and unclear. The two planes are perpendicular to each other that means one plane located in one direction such as parallel to the horizontal direction, and the other plane is located in one direction such as perpendicular to the horizontal direction that is the vertical direction, but how a LCD device has a horizontal plane and a vertical plane in the device. For examination purpose, the two planes are perpendicular to each other means that the optic axes in planes are perpendicular to each other.

Claims 6-9, 11-14, 20-24 are dependent on claim 1, and claims 16-19 are dependent on claim 15. Therefore, all the dependent claims have the deficiency set forth above.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant admitted prior art (AAPA) in view of US 6,081,312 US 2004/0051832 A1 (Shimoshikiryoh), US 5,747,121 (Okazaki et al) and US 6,081,312 (Aminaka et al).

Claim 1, AAPA discloses (page 1, line 11 – page 4, line 10; Fig.4A) a vertical–aligned liquid crystal display (an imaging component) comprising:

- a vertically aligned nematic liquid crystal cell (14);
- a polarizer (18 or 12) disposed on each side of the vertical aligned liquid crystal cell (14), the polarizers (18 and 12) having polarization axes orthogonally crossed with respect to each other in a direction normal to the cell surface;
- a compensation film (27) disposed between the liquid crystal cell (14) and a polarizer (18).

AAPA does not expressly disclose that the compensation film comprises a first positive birefringent material disposed on a base film having negative optical anisotropy with an axis along the normal of the substrate and a second positive birefringent material disposed on the first positive birefringent material, and each of the positive birefringent materials oriented with their optic axis tilted in planes perpendicular to the liquid crystal cell surface, so that the optic axes in planes are perpendicular to each other.

However, Shimoshikiryoh discloses (paragraph 0134-0135; Fig.4) that the phase difference compensator (102) (as a second birefringent material) and the phase different compensator (104) (as a first birefringent material), so that is a second birefringent material dispose on a first birefringent material, and the phase difference compensator (102) typically has a positive uniaxial refractive index anisotropy, and the phase difference compensator (104) typically has a biaxial refractive index anisotropy, that means the birefringent also can be positive birefringent material. Shimoshikiryoh also discloses (paragraph 0138) that a pair of electrodes arranged to interpose a liquid crystal layer therebetween are used to apply a vertical (to the substrate) electric field across the liquid crystal layer to drive the liquid crystal molecules. Such that the compensator also can be used in vertical alignment nematic liquid crystal cell, i.e., the liquid crystal molecules are oriented substantially vertically to the substrate surface in the absence of an applied voltage (paragraph 0004).

Shimoshikiryoh indicates (paragraph 0135) that using such compensation provides a display with desirable viewing angle characteristics.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange a compensation film comprises two positive birefringent material as claimed for achieving a desirable viewing angle characteristics.

Still lacking limitation is such that the first positive birefringent material disposed on a base film having negative optical anisotropy with axis along the normal of the substrate.

However, Okazaki discloses (col.2, lines 12 – 41) that it is known that the optical compensatory sheet is needed to have negative birefringence for compensating positive birefringence of the twisted nematic liquid crystal and an inclined optic axis. Such that the compensation film is needed to have a positive birefringence for compensating the negative optical anisotropy with an axis along the normal of the substrate, and that would have been at least obvious variation. Okazaki also discloses (col.2, lines 27 – 41) that it also is known that the optical compensatory sheet for LCD is prepared on a support film (base film) to support the compensation film.

Since the compensation film must have a base film to support the compensation film and the positive birefringent material must compensate the negative optical anisotropy material so that to enlarge the viewing angle of the display.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange a base film for supporting the compensation film, and the base film should have negative optical anisotropy to compensate the positive birefringent.

Still lacking limitation is such that the first and second compensator in which the optic axis tilted in planes perpendicular to the liquid crystal cell surface, so that the optic axis in planes are perpendicular to each other.

However, Aminaka discloses (col.7, line 14 – col.8, line 31; Fig.7-8) that the optical compensatory sheet in Fig.7 comprises optical anisotropic layer (73), and each of the molecules has one plane (Pa, Pb, Pc) which inclined with

respect to the planes (71a, 71b, 71c), i.e., the optic axis tilted in planes perpendicular to the liquid crystal cell surface, so that the optic axis in planes are perpendicular to each other.

Aminaka indicates (col.8, lines 24-31) that an optical compensatory sheet has a function of improving the viewing angle and such function can be further improved where the inclined angle changed (tilted) as shown in Fig.7, so that the optical compensatory sheet has a function of preventing an image from reversion, gray-scale inversion and color contamination of a displayed image. Even though the discotic compounds contained in the optical anisotropic layer (73), but Aminaka indicates the principle of the compensator having tilted in planes perpendicular to the liquid crystal cell surface so that the optic axis tilted in planes perpendicular to each other would improve the viewing angle and prevent the image from reversion, gray-scale inversion and color contamination of a displayed image.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange a compensation film combined with a vertical alignment liquid crystal cell so as to tilt the molecules as claimed in claim 1 for improving the viewing angle and preventing image from reversion, gray-scale inversion and color contamination of a displayed image.

5. Claims 8, 14-15, 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA, Shimoshikiryoh, Okazaki and Aminaka as applied to claim 1 above, and further in view of US 6,319,963 (Coates et al).

Claim 15, lacking limitation is such that the vertical aligned liquid crystal

cell is disposed between the polarizer and a reflective plate.

However, Coates discloses (col.3, line 60 – col.4, line 28) that a reflective film prepared on a substrate is suitable for mass production, and using reflective polarizer (such as a reflective plate) in a liquid crystal display exhibits a high luminance and a considerable brightness gain up to large viewing angles.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange a reflective plate as claimed in claim 15 for achieving high luminance and a considerable brightness up to large viewing angles.

Claims 8, 14, 17 and 19, lacking limitation is such that the tilt in the optical axis of the compensation film varies.

However, Aminaka discloses (col.7, line 14 – col.8, line 31; Fig.5-8) that the optical compensatory sheet in Fig.7 comprises optical anisotropic layer (73), and each of the molecules has one plane (Pa, Pb, Pc) which inclined with respect to the planes (71a, 71b, 71c), i.e., the optic axis tilted in planes perpendicular to the liquid crystal cell surface, and the tilt angle (θa, θb, θc) varies.

Aminaka indicates (col.8, lines 24-31) that an optical compensatory sheet has a function of improving the viewing angle and the inclined angle changed (tilted) so that the optical compensatory sheet has a function of preventing from an image reversion, gray-scale inversion and color contamination of a displayed image.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange a compensation film combined with a vertical alignment liquid crystal cell so as to tilt the molecules as claimed in claims 8, 14, 17 and 19 for improving the viewing angle and preventing image from reversion, gray-scale inversion and color contamination of a displayed image.

6. Claims 6, 9 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA, Shimoshikiryoh, Okazaki and Aminaka as applied to claim 1, above, and further in view of US 6,115,095 (Suzuki et al).

Claim 6, lacking limitation is such that two positive birefringent layer having different thickness.

However, Suzuki discloses (col.12, line 21 – col.13, line 20; Fig.11) that using first compensation layer (25) having positive optical anisotropy and second compensation layer (26) having positive optical anisotropy, and the two compensation layer can be positioned adjacent to each other (such as one compensation layer disposed on the other compensation layer), and the compensation layer must have a base film to support the compensation layer.

Suzuki also discloses (col.8, lines 27-58) that a product (ΔnF2xdF2) of index anisotropy ΔnF2 and a thickness dF2 of the second compensation layer (26) is equal to a quarter of the product (Δnxd) of index anisotropy Δn and a thickness d of the liquid crystal layer, and a product (ΔnF1xdF1) of index anisotropy ΔnF1 and a thickness dF1 of the first compensation layer (25) is equal to about a half of the product (Δnxd) of index anisotropy Δn and a thickness d of the liquid crystal layer.

The same material for the compensation layer must have the same index anisotropy, such that the thickness dF2 of the second compensation layer must be different (such as thinner) from the thickness dF1 of the first compensation layer. So that Suzuki discloses using two compensation layers having different thickness.

Suzuki indicates (col.7, lines 57-59) that such compensation layers compensate the fluctuation in birefringence of the liquid crystal layer caused by variation of a viewing angle. Suzuki also indicates (col.8, lines 20-26) that using two compensation layers to prevent occurrence of light-loosing in oblique viewing angle. Suzuki also indicates (col.9, lines 35-52) that an increase or decrease of birefringence in a liquid crystal layer is compensated for by birefringence variation in a compensation layer when a viewing angle varies, and ensures enhanced optical compensation effect.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use two compensation film having positive birefringent material and having different thickness as claimed in claim 6 for preventing the light-loosing in oblique viewing angle and compensate the birefringence variation and enhancing the optical compensation effect.

Claim 9, AAPA disclosed (paragraph 0032) that a photo-alignment method was suggested by Schadt et al (Japanese Journal of Applied Physics, 1995), for example, a thin alignment layer is coated on the base film. An alignment layer can be used to control the pretilt of the liquid crystal molecules; and the function

of the alignment layer is to control the pretilt of the liquid crystal molecules, and that is conventional as the alignment layer is needed to generate a tilt angle.

Claim 11, AAPA discloses (Fig.4A) that a compensation film (27) disposed on each side of the liquid crystal cell (14), and between the cell (14) and each of the polarizers (18 or 12).

Claim 12, AAPA discloses (Fig.4A) that two compensation films (27 and 30) disposed between the vertical aligned liquid crystal cell (14) and one of the polarizers (18 or 12).

7. Claims 7, 13, 16,18 and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA, Shimoshikiryoh ,Okazaki and Aminaka as applied to claims 1 and 15 above, and further in view of US 5,796,456 (Takatori et al).

Claims 7, 13, 16 and 18, lacking limitation is such that the tilt in the optic axis of the compensation film is uniform.

However, Takatori discloses (col.6, lines 15-62) that the optical compensation layer uniformly tilt against the axis normal to the surface of the optical compensation layer, so that the direction of each of their respective optical axes almost correspond to the direction of the liquid crystal when a voltage is applied to the liquid crystal, and such the optical compensation layer improves the view angle dependency.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange the tilt in the optic axis of the compensation

film is uniform as claimed in claims 7 and 13 for improving the view angle dependency.

Claim 20, concerning the limitation of an electronic imaging device containing the component of claim 1 that is only given weight as intended use, because any display can be used for the electronic imaging device.

Claims 21-24, AAPA disclosed (paragraph 0032) that a photo-alignment method was suggested by Schadt et al (Japanese Journal of Applied Physics, 1995), and the desired alignment is obtained by photo-alignment, mechanical rubbed surface of alignment layer or other known method employ shear orientation and effect of an electric or magnetic field. That is common and known in the art and using photo-alignment such as using UV-irradiation as the shear force would have stronger alignment and the UV-irradiation would reduce the surface friction and protecting the display panel.

Response to Arguments

8. Applicant's arguments filed on Feb.28, 2005 have been fully considered but they are not persuasive.

Applicant's arguments are as follows:

1) The prior art of references cannot be combined to provide motivation to arrive at the invention.

Examiner's responses to Applicant's arguments are as follow:

1) The reference Shimoshikiryoh is relied on that the phase difference compensator (102) (as a second birefringent material) and the phase different

compensator (104) (as a first birefringent material), so that is a second birefringent material dispose on a first birefringent material, and the phase difference compensator (102) typically has a positive uniaxial refractive index anisotropy, and the phase difference compensator (104) typically has a biaxial refractive index anisotropy, that means the birefringent also can be positive birefringent material.

The reference Okazaki is relied on that it is known that the optical compensatory sheet for LCD is prepared on a support film (base film) to support the compensation film.

The reference Aminaka is relied on that the optical compensatory sheet in Fig.7 comprises optical anisotropic layer (73), and each of the molecules has one plane (Pa, Pb, Pc) which inclined with respect to the planes (71a, 71b, 71c), i.e., the optic axis tilted in planes perpendicular to the liquid crystal cell surface.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory

period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (571) 272-2299. The examiner can normally be reached on M-T 8:00 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mike Qi
April 25, 2005

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